

## REMARKS

Claims 27-28, 30-38, 41 and 45-49 are rejected under 35 U.S.C. § 112, first paragraph, for the reasons noted in the official action. The inadequate written description rejection is acknowledged and respectfully traversed in view of the following remarks.

The rejected claims 33, 41, 48, and 45 and 49 are accordingly amended, by the above claim amendments, and the presently pending claims are now believed to overcome the raised § 112, first paragraph, rejections.

In this regard, the word "approximately" has been deleted from each of claims 41 and 48 thereby limiting the distance by which the metal foil extends across the front surface of the glass substrate from its side surface to "6 mm or less", as stated specifically at line 8 of paragraph [032] of the specification. An amendment has been made to claim 33 to limit it correspondingly.

The words "in proximity to" have been replaced in claim 45 by "below". The location of the source of infra-red radiation "below" the second surface of the glass substrate. Additionally the description at line 3 of paragraph [024], at line 2 of paragraph [027], and in the penultimate line of paragraph [028], make it clear in the context of Figure 3, that the source of infra-red radiation heat is located below the second surface of the glass substrate. By way of clarification in this connection an additional amendment has been made to claim 45 to provide that the thermosetting powder is deposited on the first surface of the glass substrate with the first surface uppermost of the first and second surfaces of the glass substrate; this orientation finds support in the second sentence of paragraph [023] of the specification.

With regard to claim 47, the Examiner has requested clarification or support for the specified claim limitations. The Applicant has amended paragraph [032] to clarify the basis for the specified claim limitations. As recognized by the Examiner, paragraph [032] states that the width of the margin 8 (second border) is 6 mm or less, whereas the width of the margin 9 (first border) is within the range of 100 - 150 mm. When comparing the width of the first border to the width of the second border, the Applicant notes that there are only three outcomes possible. The width of the first border can only be one of greater than, equal to or less than the width of the second border. Since the width of the first border is between 100-150 mm and the width of the second border is 6 mm or less, the Applicant asserts the specification as originally filed provides adequate support for "the first border having a greater width than a width of the second border to reduce thermal stress in the glass substrate".

Amendments corresponding to those made to claim 45 have been made to

claim 49 to overcome the objection under 35 U.S.C. § 112 to "proximity" and by way of clarification of the orientation of the glass substrate. Also, an amendment has been made to specify the glass lid of the box as being a borosilicate glass lid.

Claims 27-28, 31, 37, 45-46 and 50 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Gerhardinger et al. '199 (U.S. Patent No. 5,714,199) in view of Luski et al. '369 (U.S. Publication No. 2003/0079369). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

It is noted that the Examiner recognizes Gerhardinger et al. '199 is silent in regard to heating the substrate from the second surface, but asserts in paragraph 10 of the official action that "the combination of Gerhardinger and Luski would inherently provide for the curing by means of conduction of the heat from the bottom to the top since glass is a known thermal conductor ... ". But it is submitted, that this assertion overlooks the clearly-stated objective of the Luski et al. '369 disclosure.

In the latter respect, the Luski et al. '369 teaching is advanced in the context of PTF printed circuits where thick films or traces are required to have good electrical performance. The films are typically of a mixture of a high melting point metal or metal alloy powder and a low melting point metal or metal alloy powder with a resin binder which functions principally to adhere the cured composition to the substrate. These metals are blended together with an organic solvent to form a wet paste or ink. (see the Luski et al. '369 paragraphs 0048 – 0050). The background of Luski et al. '369 invention recites that the previously known PFTs made in accord with the prior-art practices, namely the fast drying methods employed in the industry and reviewed in paragraphs 0002 – 0010 and 0012, "suffer from poor reliability and inadequate performance" (paragraph 0010). Luski et al. '369 attributes such poor reliability to "the damage that results from rapidly drying the wet ink or paste" (paragrph 0011). Rapid drying the wet ink or paste is said to cause uneven drying of the layer, i.e., "the surface of the layer drying earlier than the interior" which causes damage to the layer as it dries completely. In addition rapid drying of the layer is said to inhibit the conductive particles within the ink or paste from aligning, stacking and/or fusing for maximum conductivity and minimum resistance (paragraph 0011). With this as a background, Luski et al. '369 states that there is "a widely recognized need for a drying process of printed PTF circuits that is rapid and that does not damage the electrical properties of the layer and the resulting trace" (0014).

The objective of the Luski et al. '369 teaching is that of overcoming the problems that are experienced in the specialized technical area of fabricating PTF

printed circuits where rapid drying or curing is required. The Examiner asserts in paragraph 10 of the official action, that Luski et al. '369 teaches a number of features that are related to limitations recited in the rejected claims. However, the Applicant submits that the Examiner's statement beginning at line 10, which recites:

*As such, Examiner takes the position that since the process of heating is the same as that presently claimed, the combination of Gerhardinger and Luski would inherently provide for the curing by means of conduction of the heat from the bottom to the top ...*

is indicative that any such combination of the teachings of Gerhardinger et al. '199 and Luski et al. '369 results from a benefit of hindsight approach (*ex post facto* analysis) to the claimed subject matter. It is submitted that it is not appropriate under 35 USC § 103(a) to approach the issue in this way. The Applicant asserts that the arguments, advanced by the Examiner, concerning the combination of features of the two references is selective according to the requirements of the claims without giving consideration to the backgrounds against which those features are presented in the two references. As the Examiner states in paragraph 12 of the official action, "[a]ll of the elements were known in the art", but that is generally true of all patent claims. The contexts in which those individual "elements" or claim-features are known is relevant to the issue of whether their combination would have been obvious to a person having ordinary skill in the art to which the subject matter pertains.

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Gerhardinger et al. '199 relates to a method of producing decorative, architectural and automotive glass (col. 1, Ins. 17-22) which achieves the objective applying a polymer backing to a glass substrate on-line (col. 1, Ins. 66-67), and more specifically to apply the backing while the glass substrate is hot from manufacture or tempering and thereby eliminate additional heating and curing steps (col. 2, Ins. 9-16). It is submitted that against this background there is clearly no motivation to adopt any of the Luski et al. '369 teachings, since (a) the area of technology with which Luski et al. '369 are concerned (fabrication of Polymer Thick Film printed circuits) is distinct and remote from the area (decorative, architectural and automotive glass) with which Gerhardinger et al. '199 are engaged, and (b) adoption of the Luski et al. '369 teaching of progressive steps of controlling heating and air-flow to gradually increase the applied heat from a low temperature to a high temperature (see for example, Luski et al. '369 paragraph 0045) would require addition to, and radical changing of, what is fundamental to the Gerhardinger et al. '199 method (namely, the backing of a substrate on-line while the substrate is

already hot). Moreover, adoption of the Luski et al. '369 teaching in what is taught by Gerhardinger et al. '199 would effectively mutilate what is taught by Gerhardinger et al. '199, in the requirement to replace the Gerhardinger et al. '199 economic use of heat from substrate-manufacturing processes, by stages of applying the Luski et al. '369 teaching of applying increasing temperature ranges and air-flow control.

The reference of Gerhardinger et al. '199 provides all that is required in regard to a method that is efficient and economic in providing a substrate that is inherently hot enough for the curing process to take place automatically, and even if Luski et al. '369 could be seen merely as offering an alternative method of heating the substrate from a low temperature to a temperature that is high enough for the curing process, there would be no incentive to adopt it in what Gerhardinger et al. '199 teach because it offers no advantage or economy over what Gerhardinger et al. '199 already enjoys. Even if Luski et al. '369 were seen to teach heating a substrate from below, this would be seen as irrelevant in the context of Gerhardinger et al. '199 where the substrate is already inherently, and most economically hot enough for curing. It is submitted that in this and the other arguments advanced above, the teaching of Luski et al. '369 has no obvious application to the teaching of Gerhardinger et al. '199.

The Examiner refers to the Luski et al. '369 advantage of forming uniform coatings by eliminating the "skin effect". But Luski et al. '369 attribute the lack of the skin effect to the avoidance of fast drying methods which dry the outer layer substantially faster than the interior (lines 6-8, paragraph 0055). In Gerhardinger et al. '199 with the hot substrate providing the heat for "drying" (curing), the outer layer will not be "dried" (cured) faster than the interior, since the heat moves upwardly through the coating from the substrate. There will accordingly be no "skin effect", and the advantage of this offered by Luski et al. '369 has no relevance and attraction in the context of Gerhardinger et al. '199. Thus, contrary to the Examiner's assertion in his paragraph 12 that:

*... The motivation to combine the above references is drawn towards the method forming uniform coatings by eliminating the "skin effect" ...*

is not present in the context of Gerhardinger et al. '199 simply because the cause of the skin effect as described by Luski et al. '369, does not occur in the Gerhardinger et al. '199 method using a hot substrate. Accordingly, and with due respect, the Examiner's conclusion from the quoted assertion that it would have been obvious to one of ordinary skill in the art to apply to Gerhardinger et al. '199, the method shown by Luski et al. '369, is ill-founded, and for this reason and the

others argued above it is submitted that each of claims 27-28, 31, 37, 45-46 and 50 is patentable over Gerhardinger et al. '199 in view of Luski et al. '369.

It is to be noted that the above argued reasons that it would not have been obvious to one of ordinary skill in the art to apply the method of Luski et al '369 to the Gerhardinger et al '199 method, are not the same as those of Applicant to which the Examiner refers in the "Response to Arguments" in the official action. The reasons advanced above are not related to any requirement of Gerhardinger et al '199 to create skinning on the under surface of the substrate. More particularly, in the context of claim 45 as amended (and its directly or indirectly dependent claims 27, 28, 31, 37 and 46 ) and claim 50 where the powder is deposited on the upper surface of the substrate, there is no "skin effect" experienced (or requirement for it) since the powder cures progressively upwards from the substrate. There is therefore in this context clearly nothing to motivate adoption of the Luski et al teaching of avoidance of skinning.

Claim 30 is rejected, under 35 U.S.C. § 103(a), as being unpatentable over Gerhardinger et al. '199 in view of Luski et al. '369 as applied to claim 45 above and further in view of Wang (Book). Claim 32 is rejected as being unpatentable over Gerhardinger et al. '199 in view of Luski et al. '369 as applied to claim 29 above, and further in view of Horinka et al. (Journal article). Claims 40 and 40-44 are also rejected, as being unpatentable over Gerhardinger et al. '199 in view of Leach et al. '174 (U.S. Patent No. 5,300,174). The Applicant acknowledges and respectfully traverses the raised obviousness rejections in view of the following remarks.

The Applicant submits that claims 27-28, 30-38 and 46, which are each dependent directly or indirectly on claim 45, are each like claim 45 clearly patentable over the combination of Gerhardinger et al. '199 in view of Luski et al. '369. With regard to claims 30 and 32, the Applicant respectfully submits that the combination of the base references with this additional art of Wang or Horinka et al. still fails to in any way teach, suggest, disclose or remotely hint at the above distinguishing features of the presently claimed invention. As such, all of the raised rejections should be withdrawn at this time in view of the above amendments and remarks.

Claims 40 and 42-44 are each rejected by the Examiner on the basis of Gerhardinger et al. '199 in view of Leach et al. '174 (U.S. Patent No. 5,300,174). This rejection is summarized by the Examiner in paragraph 23 of the official action which recites "[t]he motivation to apply the foil as shown by Leach is to equalize the thermal variations across the panel as well as a protective function for protecting coating against degradation from moisture and weathering. Examiner takes the

position that the distance of the foil extending would depend upon the size of glass panel and the level of thermal variation of the panel and coating of the powder". However, the originally filed specification addresses the relationship between the dimensions of foil and the degree of thermal equalization and protection offered by the foil (paragraphs 039 - 042). Contrary to the Examiner's contention, metal foil that extends inwardly across the back surface of the panel from its edges over a limited distance of 100-150 mm has been found to be adequate in providing thermal stress relief in comparison to a panel having a full-foil backing, even in a double-glazing spandrel panel of a building. The reference of Leach et al. '174, teaches that the foil extends over the entire back surface of a comparable architectural double-glazing panel. Accordingly, the glass product of each of claims 40 and 42-44 has significant advantages of economy over the panels as taught by Leach et al. '174, and achieves these advantages in a manner that is surprising and unexpected.

Therefore, the Applicant submits that the claims of the application are distinct from the teachings of Gerhardinger et al. '199 and Leach et al. '174 as these reference fails to teach, disclose, suggest or even hint at the claimed features of partially covering and bonding a metal foil to the back surface of the glass product.

Claims 27, 28 30-38 and 40-50 remain in this application, and on the basis of the amendment and argument advanced above, it is submitted that each of them is patentable.

In the event that any further amendment to any of the claims of this application is believed or deemed necessary, then the Examiner is invited to contact the undersigned representative of the Applicant in order to discuss further amendment of the above identified application.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

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Respectfully submitted,

  
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